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L37: Entry 2 of 6 File: DWPI Mar 2, 2000

DERWENT-ACC-NO: 2000-196617
DERWENT-WEEK: 200066

TITLE: Photonic semiconductor device, especially an LED, laser diode or photodiode, comprises an indium, gallium and/or aluminum nitride semiconductor layer on a Z-cut quartz substrate

INVENTOR: KADOTA, M

PATENT-ASSIGNEE:

ASSIGNEE	CODE
MURATA MFG CO LTD	MURA

PRIORITY-DATA: 1998JP-0230599 (August 17, 1998)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
DE 19938480 A1	March 2, 2000		009	H01L033/00
JP 2000058912 A	February 25, 2000		005	H01L033/00

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
DE 19938480A1	August 13, 1999	1999DE-1038480	
JP2000058912A	August 17, 1998	1998JP-0230599	

INT-CL (IPC): H01L 33/00; H01S 5/323

ABSTRACTED-PUB-NO: DE 19938480A
BASIC-ABSTRACT:

NOVELTY - A photonic semiconductor device comprises a compound semiconductor layer of indium, gallium and/or aluminum nitride on a Z-cut quartz substrate.

DETAILED DESCRIPTION - A novel photonic semiconductor device comprises a Z-cut quartz substrate bearing a layer of InxGayAlzN, where x + y + z = 1, x = 0 to 1, y = 0 to 1 and z = 0 to 1. An INDEPENDENT CLAIM is also included for a photonic device comprising a Z-cut quartz substrate bearing a sequence of an n-GaN thin film, an n-AlGaN layer, an InGaN layer, a p-AlGaN layer, an electrode on the p-GaN layer and an electrode on the n-GaN layer. Preferred Features: A GaN, ZnO or AlN thin film buffer layer may be provided between the substrate and the compound semiconductor layer.

USE - As a blue light or UV emitting LED or laser diode or as a blue light or UV detecting photodiode.

ADVANTAGE - The Z-cut quartz substrate has low cost compared with prior art sapphire and SiC substrates and allows formation of a high quality InxGayAlzN layer which has low lattice mismatch and which is oriented in the c-axis direction.

DESCRIPTION OF DRAWING(S) - The figure shows a cross-sectional view of a photonic semiconductor device.

photonic semiconductor device 1

Z-cut quartz substrate 2

n-GaN thin film 3

n-AlGaN layer 4

InGaN layer 5

p-AlGaN layer 6

p-GaN layer 7

electrodes 8, 9

CHOSEN-DRAWING: Dwg.1/5

TITLE-TERMS: PHOTON SEMICONDUCTOR DEVICE LED LASER DIODE PHOTODIODE COMPRISE INDIUM GALLIUM NITRIDE SEMICONDUCTOR LAYER CUT QUARTZ SUBSTRATE

DERWENT-CLASS: L03 U12 V08

CPI-CODES: L04-A02; L04-A02D; L04-E03;

EPI-CODES: U12-A01A1A; U12-A01B1B; V08-A01D; V08-A04A;

UNLINKED-DERWENT-REGISTRY-NUMBERS: 1520U

SECONDARY-ACC-NO:
CPI Secondary Accession Numbers: C2000-061149
Non-CPI Secondary Accession Numbers: N2000-145596

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USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l41 and l44	2	L45
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	inspect$3	283133	L44
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l41 and l8	1	L43
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l41 and l9	0	L42
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l40 and (l6 or l7)	28	L41
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	((250/504R |250/504H)!.CCLS.)	806	L40
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l2 and l10	0	L39
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l14 and l9	0	L38
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l9 and l10	6	L37
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l32 and l8	1	L36
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l33 and l34	3	L35
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	(fluorescent near2 dye)	13443	L34

USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l32 and (l6 or l7 or l10 or l13)	5	L33
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	((250/302)!.CCLS.)	414	L32
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l28 and l30	4	L31
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	((250/493.1 |250/494.1 |250/495.1 |250/496.1 |250/497.1 |250/498.1 |250/503.1 |250/504R |250/504H)!.CCLS.)	1965	L30
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l28 and l2	0	L29
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	(l18 or l19 or l20)and l26	102	L28
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l14 and l2	64	L27
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	((250/$)!.CCLS.)	93057	L26
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l20 and l2	0	L25
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l21 and l2	1	L24
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l22 and l2	0	L23
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l21 and l12	10	L22
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	(l18 or l19) and l11	511	L21
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l5 and l13	438	L20
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l5 and l8	38	L19
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l5 and (l6 or l7)	712	L18
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l14 and l10	0	L17
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l14 and l8	2	L16
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l14 and (l6 or l7)	5	L15
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l2 and (l3 or l4)	64	L14
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	(plural$3 or multipl$5) with diodes	31785	L13
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	dichroic adj filter	1771	L12
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	lens or filter	1370792	L11
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	(indium adj gallium adj nitride) with (laser near2 diode)	14	L10
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	(indium adj gallium adj nitride) near2 semiconductor	25	L9
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	(blue or uv or ultraviolet) near4 diode	2663	L8
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	laser near2 diode	48981	L7
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	light-emitting near2 diode	24746	L6
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	(lamp or diode or baulb) near2 (enclosure or housing)	12797	L5
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	refrigerat$3	162209	L4
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	air adj condition$3	145442	L3
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	detect$3 near4 (fluorescent near2 dye)	934	L2
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	detect$3 near4 (fluorescent nea2 dye)	0	L1